librarian embodied it in a recommendation which he laid before the Public Libraries Committee, which resolved that the Public Library should stop taking in the following:—London Mathematical Society Proceedings; *Journal de Mathématiques*; *Quarterly Journal of Mathematics*; *Fortschritte der Mathematik*; *Mathematische Annalen*; and should take instead: *Annali di Matematica: Tortolini*; *Bulletin de la Société Mathématique de France*; *Atti dei Lincei*; *Zeitschrift für Mathematik: Schlömilch*; *Giornale di Matematiche: Battaglini.*

The Public Library periodicals were to be stored so as to be accessible to Armstrong College readers, duly accredited, for consultation in the library and for use at home. For future volumes of the first set of periodicals, properly accredited Public Library readers were to have similar access to Armstrong College volumes.

A copy of the resolution was sent to the Library Committee of Armstrong College, which likewise adopted it. The curators of Armstrong College Library (Profs. Bedson and Duff) and the public librarian were then in a position to carry the scheme into practical working. They decided the appropriate dates for discontinuing old periodicals and for starting new ones; they arranged that the students of each library should be admitted to corresponding privileges in the other library; and they drafted and printed the necessary regulations and forms.

As the scheme was found to work satisfactorily for the mathematical section, the committees concerned authorised extension of the idea. The officers accordingly made further revisions in other subjects, at meetings which they held from time to time. The classical section was first dealt with, and the responsibility of providing the leading periodicals was allocated to one institution or the other. Other sections were dealt with in due course. In this way all the more important journals taken by the two institutions (scientific, historical, philosophical) have been assigned to one or other of the libraries, with the result that unnecessary duplication of expenditure is now avoided. Naturally, a certain amount of duplication is still necessary, since a single copy will not always answer the needs of students. But the general result is that a good deal of money has been set free, and has been used for covering fresh ground.

The same principle has also, to some extent, been adopted as regards buying expensive books, of which one copy in the town is sufficient. It may be added that, as a side issue of this cooperation, there will shortly appear, in a catalogue which the Public Library is issuing, the titles of a number of interesting books on classical subjects which the library of Armstrong College possesses, but which are not duplicated in the Public Library.

Basil Anderton.

Public Library, Newcastle-upon-Tyne.

Mars and a Lunar Atmosphere.

In his interesting letter on the above subject in Nature of March 7, Mr. Whitmell is quite correct where he mentions that the moon was at full on October 16, 1902, when, according to my note, Prof. Luther observed an occultation of Mars. In fact, there was a total eclipse that night, and that was the phenomenon which Prof. Luther actually observed.

The abridgment of a previously condensed translation led to the substitution of the misleading "similar," and I must apologise to Mr. Whitmell for the trouble this may have caused him in looking the matter up. Prof. Luther on that occasion observed a section of a dark concentric ring bordering the small crescent of the nearly totally eclipsed moon, and this he suggested might be caused by the absorption of a fairly extensive atmosphere.

The Writer of the Note.

Observed Fall of an Aërolite near St. Albans.

Under the above heading in the issue of Nature for last week I reported upon the circumstances and other details of a supposed fall of a meteorite during the storm of March 4, as described to me by an observer, Mr. H. L. G. Andrews, at Colney Heath, near St. Albans. I have now submitted the stone for examination to Dr. George T. Prior, of the British Museum (Natural History), who informs me that it is not of meteoric origin.

G. E. Bullen.

Hertfordshire Museum, St. Albans, March 16.

THE INFLUENCE OF WEATHER ON BEES.

ALTHOUGH all who are interested in bees, either from the scientific or the commercial and practical sides, are agreed that the weather plays a most important part in their lives, very little appears to have been done to ascertain the exact effects which different kinds of weather have upon them. The reason may well be that those who are interested in bees from a practical point of view would not be able to devote the time necessary to the making of elaborate observations of the weather and the weighing of colonies daily, to say nothing of the laborious calculation necessary to ascertain the results of the observations.

In the autumn of 1910, the so-called Isle of Wight disease was raging very fiercely in the southern counties, and to account for the widespread character of the scourge, many beekeepers advanced the idea that a succession of bad seasons was responsible to a great extent, if not entirely, for the trouble.

It seemed to me that the proper course to pursue was to make a long series of observations in order to find out what particular kinds of weather were most conducive to the well-being of bees or the reverse. I therefore commenced, in April of 1911, a series of experiments. Commencing with a strong colony, which weighed with its hive 39 lb. on April 20, I began to weigh it every evening, and on May 5, for the sake of comparison, I also weighed a weak colony. This only weighed with its hive 36½ lb., the other being on that date 8 lb. heavier. The bees were hybrids, an excellent and good-tempered variety, eminently suitable for experiments, though not the best of honey gatherers.

The queens of both colonies were sisters, that of the strong one having been raised in 1909, and that of the weak one in 1910. It is pretty universally agreed among beekeepers that a queen in her second year is at her best, and according to this idea, which is quite sound, the weaker colony should have done better than the other, but there is a factor in the situation which is really more important than the age of the queen. This is the amount of stores possessed by the colony at the commencement of the season. Should there be a shortage of stores, breeding is much slower;

and although, by artificially feeding the weaker colony for the first week or so, I might have made good the deficiency, I wished the experiments to represent as far as possible the natural increase of the bees. To this may be attributed the comparatively poor results achieved in a good season.

My apiary is situated about 300 ft. above sea-level, and stands in a sheltered, sunny position. The main honey-producing plants are, in April, the sallows and the bush fruits, currants and gooseberries. Then follow, in this case during the first ten days in May, pears, plums, cherries. After this the apples (both cultivated and wild) produced a plentiful supply of nectar, and these, accompanied by the holly, sycamore, and horse chestnut, lasted till nearly the end of the month. The maple, which in some districts is a valuable aid to brood rearing, is scarce near me.

Down to May 20 the weather had been of a somewhat varied character, the sky being frequently overcast and seldom clear, the winds mainly from the south-west, and light to fresh in force. The temperature, however, was above the mean, the minima being exceptionally high for the period. On the evening of the 21st the strong colony was 17 lb. heavier, and the weak one only 4 lb.

On the 22nd the temperature rose considerably and the sky was clearer; in the ten days ending May 31 the strong colony gained 16 lb., and the weak one 4 lb. The hawthorn came into bloom soon after the middle of the month, and provided a very heavy crop of pure honey of delicious flavour and density. This hawthorn honey-flow continued during the first ten days of June, and during that period there was a gain of 8 lb. in the strong hive and 3 lb. in the weak one.

By this time the strawberries were in bloom, and the main honey flow seemed to be close at hand. The blackberries, which are a great honey source in this neighbourhood, began about the 5th of the month, and the white clover, from which the main crop is usually gathered, on the 8th. Notwithstanding this, the remainder of the month was of an exceedingly disappointing character, owing to the prevalence of high winds, low temperatures, and largely overcast skies. On June 30 the colonies weighed 82 lb. and 47 lb. respectively, being a gain during the twenty days of 2 lb. and ½ lb. only.

No sooner did July open, however, than the weather improved, the wind blowing lightly from the north-east, the sky clear, and high temperatures prevailing. Honey came in at a great rate down to the 22nd of the month, when the flowers dried up completely on account of the drought. During this period nearly all the surplus was procured from the white clover; the limes, which were certainly blooming freely, seeming to have little attraction for the bees, and the blackberries producing only a small portion of the surplus.

In the twenty-two days the strong colony gained 32 lb. and the weak one 25 lb.

Before passing on to state the conclusions I arrived at after tabulating all the results, I may point out how marked is the difference between the colony having large stores to commence the season with and one that is deficient in that respect. As will be seen, the weak colony did practically nothing during the May honey flow, owing to its being so much behind in breeding; but when the queen, having plenty of supplies, began to push the breeding, the colony pulled up nearly level, and had there been any heather here it is most probable she would have outstripped her older sister. This is a lesson the practical beekeeper may well take to heart. A few pence spent on sugar in the autumn will be amply repaid by an early crop of honey the following season.

The next striking thing is the suddenness with which a flow of honey commences and leaves off. In the May flow, for instance, after three days when there was an actual loss of weight, and one where there was only a gain of ½ lb., the next day showed a gain of 3 lb., which continued more or less for several days. Again, on July 2, the gain was ¼ lb., but on the 3rd 2¼ lb., followed by 3¼ lb., 4½ lb., 2½ lb., 3½ lb., 3½ lb., 2 lb., 2 lb. This offers another useful lesson to the beekeeper. A day's delay in putting on surplus chambers may result in the bees swarming; for once they commence preparations, which they do as soon as they find their quarters getting cramped, no device will stop them, and they will refuse to enter the supers. If the extra room is provided in good time, they take to it readily and work steadily on.

It is impossible in the space of this short article to give the details of the observations made. All that can be done is to state as briefly as possible what conclusions are to be drawn from an analysis of them.

The total gain of the strong colony, which I will call No. 1, was 76 lb., which is an average of 0·791 lb. per day. The weak stock (No. 2) gained 36½ lb., or an average of 0·447 lb. per day.

The range of pressure over the whole period was very small, the barometer being universally high, but I have divided the readings into three equal parts, high, medium, and low. On the twenty-eight days when the mercury was high the gains averaged for No. 1, 1·402 lb.; No. 2, 0·936 lb. On the thirty-one medium days, No. 1 averaged 0·710 lb., and No. 2 0·218 lb. On the days of comparatively low pressure, No. 1 averaged 0·203 lb., and No. 2 0·125 lb.

Here we have conclusive evidence that a high barometer is favourable. Especially is this the case with the weak stock, for it does very badly under any except the best conditions.

With regard to temperature, I have divided the maxima also into three sections, those under 65° F., those between 66° and 75°, and those above 75°. As may be expected, with the high readings come good results, the average being 1·182 lb. for No. 1, and 0·743 lb. for No. 2. With a medium day temperature, No. 1 averaged 0·723 lb., and No. 2 0·213 lb. Under low temperature I find the results extremely poor, the average of twenty-three days being 0·108 lb. for No. 1, and an actual loss of 0·068 lb. for No. 2.

No doubt the extremely bad effect of low day temperature on a weak colony is occasioned by the necessity on such days for the bulk of the population to stay at home and keep up the temperature, or, alternatively, the loss of brood by chilling.

Of course, the influence of the weather is felt in two distinct ways. There is the effect on the bees themselves, regulating the numbers that are able to leave the hive, and also the influence on the flowers, occasioning a variation in the amount of nectar secreted.

It is generally held that warm, moist nights are favourable to the secretion of nectar, but although my results show that more honey was secured when the previous night's temperature was high, yet when we remember that the extremely low temperatures occurred when there were few flowers in bloom, the evidence is not sufficient to enable us definitely to state that warm nights induce a flow of nectar.

There is much less disparity in the results under this head than with any other elements, the results being for temperatures under 50°, 0·542 lb. and 0·147 lb.; for those from 50° to 57°, 0·716 lb. and 0·343 lb.; and for those above 57°, 1·150 lb. and 0·775 lb.

Some time ago an undoubted authority on beekeeping gave it as his opinion that there was very rarely a flow of honey during the prevalence of an east wind. In order to gain some evidence on this head, I divided the tables of the direction of the wind into two parts, the first showing easterly winds, including all winds blowing from the north to south-south-east, the other including all winds blowing from the south to north-north-west. The result shows a decided advantage in favour of the easterly winds, the returns being 50 per cent. more in the case of the strong stock, and 25 per cent. in that of the weak one. It is not difficult to find the reason for this, for when the wind is in the west or south-west, other conditions are unfavourable, they being generally accompanied by cloudy skies and showery weather. On the other hand, the highest average of gains occurs when the wind is due north-east, such winds bringing dry, cloudless weather in most cases.

Of more importance is the strength of the wind. The average results when the wind was light or moderate in force were in both cases more than four times better than when the wind was blowing freshly.

In this case the strong stock suffered more than the weak one, the only instance where the weak stock proved superior. From this I conclude that the strong stock, being able to send out a larger proportion of foragers, suffered proportionately heavier losses of bees. The slightest difference in the time taken by an individual bee to return to its hive must have a great effect when we consider the thousands of journeys made in a day. Moreover, the more slowly the insects fly, the more liable are they to fall a prey to predatory birds. Many are no doubt blown to the ground by gusts of wind and become chilled before they have recovered strength to rise again. It is also certain that some, foraging on the extreme edge of the usual mile radius, are blown out of their course into regions unknown to them, and are unable to find their way back again. I am of opinion that on days when the wind blows strongly the hive entrances should be shaded, so as to tempt the bees out as little as possible, unless the hives are so situated that the bees have their foraging ground immediately around them, such as on a moor or in a clover field. If they have to fly high or travel far for their supplies, the gain of honey, if any, will be more than counterbalanced by a great loss of bees.

By far the most important element in the weather is the degree of sunshine. Warmth, dryness, stillness are all favourable to the increase of the colonies, but without bright sunshine the best results cannot be secured.

During the whole period there were fourteen days on which the sky was completely overcast, and the average for those days showed a net loss of 0·053 lb. in the strong colony, and 0·146 lb. in the weak one; whereas the average gain when at least a part of the day was quite clear was more than 1¼ lb. in No. 1, and a trifle under 1 lb. in No. 2. There were twenty-four days when the sky was intermittently overcast, and in both cases the average is below the mean of the whole period. The reason for this is that bees in the open fields when the sun is shining hurry home as soon as a cloud comes up. Sometimes, in the height of the honey flow, a cloud passing over the sun will bring them home at such a rate that on one or two such occasions I have gone out, thinking they were swarming.

I am a great advocate of placing hives where they will get the maximum sunshine, and I never allow any permanent shade near them, believing that every gleam of sunshine is gain to the hives. If it happens that the weather is cold in the early spring, or a strong wind blowing, it is easy to prop a board over the entrance to keep them in, but it is not so easy to take away a permanent sun-excluder on favourable days.

The tables showing the gains under varying degrees of humidity do not reveal any preponderance in favour of either a high or low rate of moisture. As I mentioned before, some believe that warm, moist nights are favourable to the secretion of nectar, and I hope in the course of the experiments I make in the coming season to be able to gain some definite knowledge regarding this.

The rainfall over the whole period was so small that it gives but little information, but in every case where rain fell during the previous night or on the day in question, there was either a loss or at best a very small gain.

To sum up, the facts which I consider established are:—

First, that sunshine is of the utmost importance, and every beekeeper should see that his hives get the maximum of it. This is obtained by placing the hives quite in the open, with the entrances facing south-east. They thus secure the earliest rays of light, and the bees are tempted to start work early.

Secondly, high winds cause great loss among the colonies, and it would be advisable when such prevail to keep the bees confined to the hives, unless there are sources for honey-gathering in the immediate vicinity. Unless the supers are on, the bees should on such occasions be fed artificially, so that the work of brood-rearing may not be hindered.

Thirdly, during a honey flow in the early part of the season weak colonies must have all the heat possible conserved by contraction of the brood-chamber and heavy top coverings, so that the largest number of foragers may be released.

Fourthly, as soon as the brood combs are well covered with bees, and the weather fine, the supers should be put on and covered up warmly. A day's delay at the crucial moment may ruin the prospects of a colony for the season, causing swarming and waste of time during the honey flow.

And, finally, the difference between the results secured by these two colonies shows that it is of very great importance that stocks go into winter quarters with abundance of stores, so that the earliest spell of fine weather may be utilised by the queen for pushing the breeding. The honey flow from the fruit and forest trees may be made a considerable source of revenue if colonies are got into strong condition in time to take full advantage of it.

HERBERT MACE.

THE VIVISECTION REPORT.

THE Royal Commission on Vivisection published, on February 12, its long-delayed report. Four years have elapsed since the Commissioners ceased to hear evidence: and we are left to guess at the causes of this delay. The report is already out of date: it says not a word about the work of Flexner, the work of Ehrlich, the work of Bruce, since 1908; it says nothing of the latest results of the preventive treatment against rabies and typhoid fever, nor of the latest diphtheria statistics from the hospitals of the Metropolitan Asylums Board.

Still, we can afford to forgive these defects: for the report, happily, is unanimous. There is no minority report. Two of the Commissioners died in the course of the inquiry; the remaining eight all sign the report. Three of them sign it subject to certain reservations, contained in memoranda; but these reservations leave untouched the main outlines of the report. The changes recommended by the Commission are of no profound importance to science, and are all of them within the province of the Home Office. There is none of them that requires the intervention of Parliament; and it is certain that Parliament has graver matters to think of than the exact estimate of experimental physiology and pathology.

The report is rather colourless: that is the price of unanimity. It deals with certain anti-vivisection statements politely, but there is a politeness which is not to be mistaken for approval. It reviews, quietly, what we all know already—the mighty deeds of the last thirty years, the development of Pasteur's principles, the work of Lister, the magnificent warfare against tropical diseases, and so forth. It devotes attention to the benefits gained by animals from experiments on animals; and to the public recognition of the value of such experiments. It recommends a slight increase of the Inspectorate, a further restriction of experiments under Certificate B, a special restriction of experiments involving the use of curare, that drug so much talked of and so seldom seen, and so forth. It contains some good passages: for instance:—

> "We desire to state that the harrowing descriptions and illustrations of operations inflicted on animals, which are fully circulated by post, advertisement, or otherwise, are in many cases calculated to mislead the public, so far as they suggest that the animals in question were not under an anæsthetic. To represent that animals subjected to experiments in this country are wantonly tortured would, in our opinion, be absolutely false."

And again, of certain anti-vivisection witnesses:—

> "After careful consideration of the above cases, we have come to the conclusion that the witnesses have either misapprehended or inaccurately described the facts of the experiments."

Thus, in spite of its colourless, dull style, the report is fairly satisfactory to men of science, and to the public. It comes at a time when the public is concerned with heavy national trouble and peril; and we believe that the public will be glad to leave the whole subject to the experts and to the Home Office.

NOTES.

IT is officially announced that the King has appointed Sir J. J. Thomson to the Order of Merit. Other men of science who are members of the Order are Lord Rayleigh, Dr. Alfred Russel Wallace, and Sir William Crookes.

WE understand that a portrait bust of the late Sir Joseph Hooker, from a sitting taken just before his death, has now been completed by Mr. Pennachine, the sculptor. A few visitors at Mr. Pennachine's studio, 68 Western Road, Ealing, W., consider it an excellent piece of work.

DR. CHARCOT has been awarded the gold medal of the Paris Geographical Society, in recognition of his work of exploration in south polar regions.

AT the anniversary meeting of the Royal Irish Academy on March 16, Prof. Jean Gaston Darboux and Prof. Elias Metchnikoff were elected honorary members of the academy in the section of science.

IT is announced that the twentieth "James Forrest" lecture will be delivered at the Institution of Civil Engineers on Friday, April 19, by Mr. H. R.